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SPECIAL ARTICLE

DIAGNOSIS AND TREATMENT OF GASTRIC AND DUODENAL ULCER

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If such were needed, what better illustration of the value of thorough searching for evidence and the intelligent weighing of all the evidence in arriving at a diagnosis could be given than is found in Doctor Cheney's discussion of gastric and duodenal ulcer?

By the same token, what better illustration could be desired of the dangers of diagnosis based upon incomplete evidence?

It isn't often in medical literature that we have the pleasure of reading such a succinct, clear exposition of what we do and do not know about a common ailment.

Is it likely that many persons are being treated for ulcer where ulcer is not and that many people with ulcer are being treated for something else because of lack of thoroughness in the work of some of us? I wonder.—EDITOR.

THERE is really no diagnostic history of ulcer, as was once believed and taught.

Experience forces the conclusion upon us that physical examination affords no positive sign of ulcer, while negative signs neither indicate nor exclude it.

All expected stomach contents findings may be missing and the fasting contents normal, even though ulcer exists.

The absence of blood from the stools does not disprove a diagnosis of gastric ulcer; and its presence is of value only when considered in connection with all the other symptoms and signs.

Blood Wassermann test should never be omitted from any examination, no matter of what symptoms the patient complains.

The utmost importance is attached to radiological investigation of the gastro-intestinal tract, and no conclusion is justifiable without the evidence it supplies.

In recent years we have learned to suspect infection as a cause of peptic ulcer. It seems possible, therefore, that when an ulcer relapses after careful routine treatment, or a new one develops, this may be due to re-infection.

pain by soda or by vomiting, and the occasional vomiting of blood or its passage by the bowel. But now we recognize that every one of these features may occur in combination when no ulcer is present, and not even any gastric disease, for most of them arise from gastric hypersecretion. Not all ulcers, however, cause hypersecretion, while many other diseases besides ulcer may produce it. In other words, a typical history does not necessarily mean ulcer, and ulcer may be present without a typical history. The knowledge needed for judicial determination of what the gastric disturbance really means, therefore, comes from the patient's complete and detailed statement of facts about every part of his body; and not simply from that about his gastric distress.

Physical examination, likewise, gives little reliable information about the presence of ulcer of the stomach. All the evidence usually found is subjective; that is, tenderness in the epigastrium or the right

ULCERS of stomach and duodenum do not form so large a group as we used to think; because more accurate methods of investigation have gradually substituted demonstration for inference, and so have greatly limited the cases properly designated ulcer. The more carefully we make our diagnosis, the more valuable become our conclusions about methods of treatment; for thus we eliminate conditions, on the one hand, less serious than ulcer, that would have subsided gradually even without routine therapy; and conditions, on the other hand, that no sort of dietetic and medicinal measures could possibly cure. Hence, the importance of careful study before decision is reached. The means at our disposal for diagnosis are the usual ones of history, physical examination, laboratory, and x-ray examinations.

THE PATIENT'S HISTORY AND WHAT IT TELLS US

When a patient comes for advice about digestive disturbance, it is highly important to keep an unprejudiced mind. The story should be accepted as it is related, and no attempt made to shape it to fit some preconceived idea. *There is really no diagnostic history of ulcer, as was once believed and taught.* Certain features were formerly considered characteristic, such as long duration, remissions or intermissions in the course, the relation of the symptoms to food, with hunger pain and night attacks, the general complaint of sour stomach, the relief of

or left hypochondrium. But this sign depends, in part at least, upon the patient's sensitiveness to pain, so that neither its presence nor its absence is conclusive. There is ordinarily no objective sign of ulcer, nothing that can be seen or palpated. For this reason negative evidence, the entire absence of any abnormality on physical examination, was formerly looked upon as diagnostic of ulcer, when the history had created an impression that ulcer existed; but this conclusion is unreliable, because several other intra-abdominal conditions may likewise present no physical signs, and yet give similar history. *Experience forces the conclusion upon us that physical examination affords no positive sign of ulcer, while negative signs neither indicate nor exclude it.* What we need to remember is, that the collection of data by physical examination must include the entire body, in a systematic and unprejudiced way; for in some remote finding, such as the reactions of the pupils or the condition of the prostate gland, may be discovered the clue that explains the whole digestive disturbance, no matter what the abdomen shows or does not show.

LABORATORY EXAMINATIONS AND THEIR VALUE

Stomach Contents—Naturally the first concern is about stomach contents; and the fasting contents in ulcer usually present several characteristic features: (a) The amount is frequently increased above 50 cc., due mainly to interdigestive hypersecretion, but partly to pylorospasm; (b) the total acidity and free HCl are frequently high, so that they equal or exceed the values found during the digestive stage; (c) blood is occasionally found as visible streaks or brownish shreds, or more often is discovered by the benzidine test and by red corpuscles in smears of the sediment. *All the expected findings, however, may be missing and the fasting contents normal, even though ulcer exists.* Fractional gastric analysis usually shows hypersecretion, rising gradually with each extraction, so that the total acidity and free HCl are decidedly above the normal throughout, and are higher at the end of two hours than at any previous time. This is the characteristic finding in ulcer, but it is not essential to diagnosis. Ulcer may be present, though fractional gastric analysis shows a normal secretory curve; and so many extra-gastric conditions may cause digestive, and even inter-digestive, hypersecretion that its presence alone never justifies the inferences that ulcer exists. . .

Intestinal Waste—All ulcers do not bleed, so that the stools do not always show visible or occult blood even in the presence of ulcer; and when such evidence is found, it does not necessarily mean ulcer, for there are many other possible causes for its presence. *The absence of blood from the stools, therefore, does not disprove a diagnosis of gastric ulcer; and its presence is of value only when considered in connection with all the other symptoms and signs.* The chief value of stool examination in chronic digestive disturbances is not to discover the presence or absence of occult blood; but to find whether it contains ova or cysts of parasites that may be the real cause of the symptoms the patient describes.

Urine—No proof for or against gastric ulcer can be obtained by urinalysis; but this investigation tells much about other conditions that may simulate

ulcer, such as diabetes, chronic nephritis, and renal or ureteral stone. In diabetes, gastric indigestion with pain is a not uncommon manifestation; in chronic nephritis, digestive disturbances frequently appear as a consequence of uremia; with renal or ureteral stone, attacks of pain in the right or left upper quadrant, with vomiting and reflex disturbances of gastric secretion, offer at times a perplexing resemblance to ulcer.

Blood—Unless large or frequent small hemorrhages have been caused by an ulcer, the routine blood count gives no information; and even so it shows only a secondary anemia without identifying the cause. More important, as with the urinalysis, is the possible discovery by blood examination of other conditions that may underlie the symptoms suggesting ulcer; such as pernicious anemia, leukemia, or Banti's disease.

Of even greater importance is the blood Wassermann reaction. Ulcer of stomach or duodenum may really be luetic, from a broken down gumma; or luetic conditions of the liver or at the portal fissure may cause symptoms closely resembling those of ulcer; so that the real nature of the pathology present and the treatment consequently indicated become clear only after the Wassermann test. *It should never be omitted from any examination, no matter of what symptoms the patient complains.*

Spinal Fluid—In certain dubious cases this alone can solve the diagnostic problem. It is not necessary in every case, but particularly where the finding of an abnormality in a pupillary or patellar or Achilles reflex, with failure to discover by other methods of diagnosis any explanation for the chronic digestive disturbance, arouses the suspicion of possible disease of the spinal cord. Increased cell count in the spinal fluid, increased albumen content, positive Wassermann reaction in all dilutions, even when blood Wassermann is negative, combine to make the situation clear. Not infrequently in such conditions recurrent spells of vomiting and pain are wrongly interpreted to mean ulcer until routine treatment without benefit ultimately leads to further investigation and thus to an understanding of the real pathology present.

X-ray Examination—*The utmost importance attaches to radiological investigation of the gastrointestinal tract, and no conclusion is justifiable without the evidence it supplies.* It gives direct testimony about the outline of the stomach and duodenal cap, the rate of peristalsis, and the emptying time. Thus it substitutes demonstration for inference and either confirms or disproves the suspicion aroused by other methods of examination. And yet it must be remembered that x-ray reports are not infallible. It is possible for an ulcer to be overlooked when present, and to be reported present when really absent. Therefore, while in general the x-ray findings are to be given great weight in diagnosis, they cannot be accepted as final proof unless they are considered in connection with all the other facts elicited by history, physical examination, and other laboratory investigations.

To sum up the data that, taken together, make a fairly certain diagnosis of chronic gastric or duodenal ulcer, there should be, *first* a history of long-

standing digestive disturbance, lasting over a period from one year to twenty, with periods of exacerbation and other periods of remission or absence of all symptoms; with characteristic features, such as the onset one to four hours after meals of burning distress, belching, water-brash, nausea and vomiting, at times hematemesis; the distress all relieved by taking food and comfort persisting until a new cycle begins at a variable period afterwards; the tendency of such attacks to occur particularly at night, rousing the patient from sleep; and the common story of the habitual use of soda. *Second*, after a thorough and systematic physical examination, involving all parts of the body, there should be found no sign of any disease except possibly tenderness high up in the abdomen, in epigastrium or either hypochondrium. *Third*, after routine laboratory examinations, stomach contents ought to show digestive and inter-digestive hypersecretion; feces should be negative except for the possible presence of occult blood; urine should be normal; blood should show no abnormality except possibly a moderate secondary anemia; and the blood Wassermann should be negative. *Fourth*, the x-ray examination ought to reveal a filling defect in the stomach or a deformed duodenal cap, with abnormal gastric or duodenal peristalsis and possibly delay at the pylorus.

If all the foregoing symptoms and signs are present, it is easy to diagnose gastric or duodenal ulcer. But it must be remembered that the so-called "ulcer history" is only a hypersecretion history, and may be produced by many other conditions besides ulcer; that physical examination aids in eliminating these other possible causes of hypersecretion, but that ulcer itself and several other diseases whose history resembles it may give no objective signs; that gastric analysis, even when it demonstrates hypersecretion, does not prove that ulcer produces it, and it may delude by showing no change from normal, even when ulcer exists; and finally that, while the recognition of ulcer rests largely on the x-ray findings, it must never rest on these alone.

DIFFERENTIAL DIAGNOSIS

When a patient complains of chronic disorder of the stomach, the question that naturally presents itself is "why?" Ulcer is only one possibility; and the symptoms it produces vary so much in degree, as well as in character, that we must give up the idea of a typical diagnostic history. Admitting this we have next to ask ourselves what else can the symptoms mean? Other conditions that must be investigated in searching for an answer to the problem can be usefully grouped as follows:

Other Intra-gastric Diseases—The chance that the patient's complaints are really due to cancer of the stomach must be kept prominently in mind; but the one definite proof for or against this is the x-ray film, no matter what may be shown by the history, physical examination and gastric analysis. The only other organic disease of the stomach occurring with any frequency is chronic gastritis; but how frequent it really is no one can say. Probably we diagnose it too often. The essentials to its recognition are abundant mucus in fasting stomach contents, with decreased gastric secretion and negative x-ray films. But be wary about accepting this diagnosis. Early

cancer sometimes lurks behind these findings, and repeated observations should be made before decision is reached.

Extra-gastric, but Intra-abdominal Pathology—Under this heading fall chronic cholecystitis and cholelithiasis, chronic appendicitis, chronic colitis, neoplasms of the intestine, hernia, tuberculous peritonitis, cirrhosis of the liver; for all of these frequently give rise to chronic disturbance of the stomach. Details for the differentiation of each of these from ulcer cannot be given here; but if history has been complete, if physical examination has been thorough, if tests of stomach contents and of stool have been carefully made, and finally if gastro-intestinal x-ray films and fluoroscopy have been employed as aids, there should be no error in the conclusion. Failure to recognize the truth usually is the result of incomplete observation.

Intestinal Parasites—A tape-worm in the intestine can cause symptoms closely simulating those of gastric ulcer, with gastric hypersecretion; but repeated search of the stool for segments or ova usually reveals the presence of the parasite. The amoeba dysenteriae, likewise, may give rise to chronic digestive disturbances calling attention to the stomach more than to the bowel; but again the discovery of cysts in the stool gives the clue to correct diagnosis. Whether the flagellates, such as giardia, should be considered an adequate explanation for chronic digestive ailments is dubious. But it is justifiable to employ the therapeutic test; and if after the proper therapy symptoms persist, in spite of the disappearance of the flagellates from the stools, all will agree that other causes must be sought.

Genito-urinary Disease—Mention has already been made of the value of routine urinalysis in every case. This will help to detect renal inflammation or calculus or neoplasm or tuberculosis, no matter how the history may delude. Only when urinalysis is omitted could these conditions fail to suggest themselves for consideration in diagnosis. One of the most frequently neglected parts of a physical examination is digital exploration by rectum. Thus, not only a neoplasm of that organ occasionally escapes recognition, but also a tender prostate or seminal vesicle that reflexly causes gastric hypersecretion with all its attendant manifestations. Cystoscopy, with ureteral catheterization, pyelograms and x-ray films of kidneys may explain long-standing digestive ailments never explained before by any other means of diagnosis; but routine urinalysis gives the first clue that prompts further investigation by these methods.

Chronic Pelvic Disease—In women, pain in the upper right or left abdominal quadrant, with reflex gastric hypersecretion and consequent symptoms of sour stomach, not infrequently are produced by chronic pelvic disease. Cystic degeneration of an ovary, chronic salpingitis, chronic infection of cervix secondary to laceration, chronic disturbance of uterine circulation from loss of perineal support, may thus cause disturbances in the stomach far removed from the actual site of the pathology that induces them. The reflex indigestion of early pregnancy may also assume the type we are wont to as-

sume as suggesting ulcer. Thus, pelvic examination becomes as important a part of the investigation as any other; and if this part is overlooked, erroneous conclusions are likely to result.

Other less frequent explanations for ulcer symptoms are gastric crises of *tabes dorsalis*, to which reference has already been made in the remarks about spinal fluid examination; diabetes as a possible source of the gastric disturbance will never be missed if urinalysis is done as a routine; pernicious anemia or leukemia will, in the same way, be revealed if blood counts are made and blood smears examined in every case; occasionally pulmonary tuberculosis makes its onset with disturbance of digestion, and, as Osler wrote long ago, "the early manifestations may be great irritability of the stomach, with vomiting or a type of acid dyspepsia with eructations." If careful physical examination is made of the lungs, supplemented by an x-ray plate of the chest, this possible source of error will be eliminated.

TREATMENT AND WHAT WE MAY EXPECT FROM IT

Only exceptionally should this be surgical; and the exceptions that demand operation are not many. First among these come the acute complications of ulcer: perforation or serious hemorrhage. Perforation of the stomach's wall, with escape of its contents into the peritoneal cavity, must be met by surgical repair of the damage done, as soon as possible after the accident occurs. Hemorrhage of consequence, especially if repeated, likewise calls for direct control of the bleeding vessel without delay. My own experience has convinced me that to persist in medical treatment under such circumstances is only to invite disaster; while a preliminary transfusion will usually make operation justifiable, even when blood loss has been extreme. Second, persistent pyloric obstruction, when revealed not only by history and physical signs, but also by x-ray plates, is a mechanical difficulty and requires mechanical methods such as gastro-enterostomy for its relief. Third, the site and size of the ulcer influence the decision about surgery. A situation on the lesser curvature, and a large defect shown there by x-ray plates, means usually that no healing can be expected by medical treatment, particularly in the saddle ulcer with hour-glass deformity. Fourth, when symptoms arise suggesting that a chronic ulcer has changed its character, particularly when loss of weight and color and strength have recently supervened, exploratory operation is justified on the suspicion that malignant degeneration has occurred. Fifth, in any case where prolonged medical treatment has failed to relieve, or where frequent relapses occur after apparent cure, surgery should be offered the patient; though with the understanding that cure is not certain even then. What method the surgeon shall employ is a matter for his judgment. Whether to excise or to cauterize the ulcer; to do a gastro-enterostomy alone or with closure of the pylorus; or a pyloroplasty; or a gastrectomy in case of suspected malignant degeneration—all these are problems for the surgeon, which his training and experience must solve.

The ordinary routine treatment of ulcer is die-

tetic and medicinal. The average patient responds well to a simple plan. My own method, for a number of years past, has been to advise the following diet, without detaining the patient in bed or even at home: "7 a. m.—Two soft-boiled or poached eggs; thoroughly toasted bread or zwieback or toasted soda crackers, with butter; a glass of milk, or a cup of cocoa made with milk and cream. 10 a. m.—A glass of warm milk (about a half-pint). 1 p. m.—Beef, mutton or chicken, picked into shreds while raw or chopped fine, then made into a meat ball and cooked rare; toast, zwieback or crackers with butter; a glass of milk. 4 p. m.—A half-pint of warm milk. 7 p. m.—A bowlful of well-cooked rice, with butter or cream and sugar; or shredded wheat biscuit, toasted crisp, with butter or cream; or toasted bread or zwieback or crackers; with any one of these, a glass of milk."

With this diet, one tablespoonful of olive oil is advised three times a day, just before the three main meals; and one or two hours after the three main meals, one level teaspoonful of a powder consisting of bicarbonate of sodium two parts, with magnesium oxide and bismuth subcarbonate of each one part. This powder not only neutralizes acidity, but regulates the bowels. If they are constipated, the heavy oxide of magnesium may be substituted for the ordinary form; or if they are too loose, or become so on this medication, then the dose should be decreased or a larger proportion of bismuth substituted. By shifting the amounts of each of these ingredients or by varying the dose, bowel movements can be controlled, as a rule, without the use of other drugs.

After a week or two on this plan, the average case is usually much improved. If it is, then a second and more liberal diet should be substituted, as in the following list: "May eat—Eggs, soft-boiled, poached or scrambled lightly; tender beef, mutton or chicken, chewed thoroughly; sweetbreads or brains; any kind of fish, cooked as desired, including oysters cooked in any way except fried; cocoa made with milk and cream; milk as much as desired, with cream; no vegetables, except baked or mashed potatoes, unless prepared as a puree; soups of any kind, if not highly seasoned, cooked with rice or barley or vegetables, but strained clear after cooking; cream soups made from milk and the puree of vegetables; any cereal, provided that it is cooked for at least three hours, and the husks and coarse particles are removed by the puree sieve; white bread thoroughly toasted, soda crackers, zwieback, shredded wheat biscuits, served with butter or cream; cream cheese; cooked fruits, such as baked apple or pear, or apple sauce, or stewed dried fruits, as prunes or peaches, if put through the puree sieve; for dessert: rice pudding, corn starch, blanc mange, custards. Avoid coarse foods, such as hard-boiled or fried eggs; tough meats or meats cooked too long; or pork, veal or ham; vegetables, such as corn, string-beans, peas or spinach, unless prepared as a puree; coarse cereals, such as oatmeal, or cracked wheat unless strained through a puree sieve; all hot breads, and fresh fruits; all irritating foods, such as very salty, sour, peppery or highly seasoned dishes of all kinds, including salt fish, pickles, salads, acid fruits and drinks, and highly seasoned soups; and

all stimulating drinks, such as coffee, tea, and all alcoholic liquors."

With this second list, the patient is instructed to continue the glass of milk at 10 a. m. and 4 p. m.; the olive oil before and the alkaline powder one or two hours after three main meals. This new plan is kept up for three to six months, with the gradual addition of new articles of soft food as time goes by, but cautiously and adhering in the main to the original list. The olive oil and the powder may be discontinued as symptoms disappear; but even after all discomfort is gone and the patient feels perfectly well, care about diet must persist indefinitely.

If the patient's suffering seems unusually severe, or if what appeared to be an average case does not improve on the plan just described, then more rigorous management must be undertaken. Rest in bed becomes essential; and a diet is advised consisting of milk and cream exclusively, in small amounts at short intervals on a modified Sippy plan; with the alkaline powder given halfway between feedings, of soda, magnesia and bismuth, varied in proportions according to the condition of the bowels. After a week of no food but milk, other articles on the first diet can be taken one by one, if all goes well; then that list can be adopted as a whole; and then gradually the second list can be substituted for the first. Detention in bed usually need not exceed two weeks.

By following the plan first described, most patients lose their symptoms without detention in bed and exclusive milk diet. Some require this more rigid routine and do not cease to suffer until it is employed. Some fail to find comfort even then, and such constitute one of the groups for whom operation has to be considered. *Experience impresses the conviction that, whatever treatment is given, ulcer may some day relapse in spite of it; and this is true after surgical, as well as after medical "cures."* Patients cared for by any plan may remain well for months or years; but after repeated indiscretions in diet or some prolonged physical or mental strain, their symptoms not infrequently recur and a new attack persists for weeks or months, exactly like the old. It seems that after any plan of dietetic or medicinal management, or after gastro-enterostomy or pyloro-plasty or any other surgical method, a weak spot remains in the stomach, of unhealthy tissue, a scar at best, always liable to make trouble at some future time. In many cases this never happens, but only too often it does, so that it appears impossible ever to assure ulcer patients that they are permanently cured.

One last word of the utmost importance remains to be said. *In recent years we have learned to suspect infection as a cause of peptic ulcer. It seems possible, therefore, that when an ulcer relapses after careful routine treatment, or a new one develops, this may be due to reinfection.* Hence, it is urgently advised in every case to search for and remove all foci, particularly those about the teeth and gums, tonsils, naso-pharynx, and sinuses, in addition to the dietetic and medicinal therapy described.

THE OPTIMUM TEMPERATURE OF OPERATING-ROOMS

By EMMET RIXFORD, San Francisco

INTRODUCTORY NOTE

The optimum temperature of operating-rooms is one of the many, many smaller and less spectacular problems of medicine. It is in the correct solution of these that, in the aggregate, we may still further reduce the hazards of surgery. The revived interest in the subject of the controversial question of the most favorable temperature for an operating-room, particularly in England, led the editor of CALIFORNIA AND WESTERN MEDICINE to ask Doctor Rixford to open a discussion of the subject for our publication.—

EDITOR.

DISCUSSION by Emmet Rixford, M.D., San Francisco; Andrew Stewart Lobingier, M.D., Los Angeles; Charles D. Lockwood, M.D., Pasadena; Wallace I. Terry, M.D., San Francisco; A. J. Ochsner, M.D., Chicago; E. Starr Judd, M.D., Rochester, Minn.

"London warms to the theme, 'Why a hot operating theatre?' apropos of an article in the Lancet, in which Dr. R. P. Rowlands, surgeon to Guy's Hospital, protests against the torrid tradition. Probably the custom of parboiling the surgeons and the spectators dates back to days before sterilization. There is no reason in this world that an operating theatre should have the climate of Yuma or Gehenna."

Why not? If the Editor had practiced surgery in Yuma or Bakersfield or Fresno in summer, he would realize that his sorrows in England were due more to humidity than to temperature. Of Gehenna we cannot as yet speak authoritatively, it being still subjudice as to whether it is wet or dry. Nevertheless, we must agree that many, if not most operating-rooms are abominably hot and humid, partly because of failure on the part of hospital authorities to appreciate what is reasonable in the premises, and partly by design under the notion that the dangers of shock and of pneumonia are diminished in some proportion to the elevation of the temperature of the operating-room. What are the facts?

So many other factors contribute to the production of shock that it is difficult to assign to any one its relative role: loss of blood, surgical trauma of the tissues, prolonged anesthesia, traction on the mesentery, pressure on the diaphragm leading to respiratory and cardiac fatigue, etc., none of which has anything to do with the temperature of the operating-room.

Eighty degrees (F.) is the conventional temperature in many operating-rooms. But why 80°? Why not 98° or 100°? The normal temperature of the interior of the body is 98.6°. It would seem to be no trifling matter then to expose the intestines for any considerable length of time to a temperature 18° or 20° lower. The obvious corollary is that the intestines should not be exposed more than is absolutely necessary in any case. If this precaution is taken it is hard to see wherein an operating-room temperature of 70° would be materially worse than 80° or even 90°.

Payr of Leipzig is said to be intolerant of a temperature above 60° or 65° in his operating-room, and we are informed that pneumonia is not more common in his clinic than in others where the surgeons and assistants are consistently "parboiled."

A person with less than his usual clothing on lying in a room at 80° soon chills—he would chill